

What is claimed is:

1. A method of etching a substrate, comprising steps of:  
providing a substrate having oxide over silicon nitride;  
providing a fluorinated plasma comprising an additive fluorocarbon having at least as many hydrogen atoms as fluorine; and  
exposing said substrate to said fluorinated plasma to etch through at least a portion of said oxide to expose a region of said silicon nitride.
2. A method according to claim 1, further comprising a step of providing said substrate a temperature of at least 30° C.
3. A method according to claim 1, wherein said additive fluorocarbon comprises at least one of  $\text{CH}_2\text{F}_2$  and  $\text{CH}_3\text{F}$ .
4. A method according to claim 3, wherein said fluorinated plasma further comprises at least one of  $\text{CHF}_3$  and  $\text{CF}_4$ .
5. A method according to claim 4, wherein said fluorinated plasma further comprises argon.
6. A method of etching a layered semiconductor substrate, comprising steps of:  
providing nitride over at least a portion of a semiconductor substrate;  
forming second different material over at least a portion of said nitride; and  
etching through at least a portion of said second material to expose at least a portion of said nitride;  
said etching using a plasma comprising an additive fluorocarbon compound having at least as many hydrogen atoms as fluorine.
7. A method according to claim 6, wherein said additive fluorocarbon compound comprises at least one of  $\text{CH}_2\text{F}_2$  and  $\text{CH}_3\text{F}$ .
8. A method according to claim 7, wherein said plasma further comprises at least one of  $\text{CF}_4$  and  $\text{CHF}_3$ .
9. A method according to claim 8, wherein said plasma further comprises argon.

10. A method according to claim 7, wherein said additive fluorocarbon compound is provided a gas flow of at least 3% of the total flow for said plasma.
11. A method according to claim 10, wherein said additive fluorocarbon compound is provided a gas flow of 3-20% of the total flow for said plasma.
12. A method according to claim 11, wherein the total flow for said plasma comprises 70-90% of at least one of CHF<sub>3</sub>, CF<sub>4</sub> and AR.
13. A method according to claim 12, wherein said total flow comprises at least 3% CHF<sub>3</sub>.
14. A method according to claim 13, wherein said total flow comprises at least 10% CF<sub>4</sub>.
15. A method according to claim 14, wherein said total flow comprises at least 33% argon.
16. A method according to claim 6, wherein said second material comprises oxide.
17. A method according to claim 16, wherein said oxide comprises at least one of undoped silicon oxide and doped silicon oxide.
18. A method according to claim 6, further comprising a step of maintaining said substrate at a temperature above 30° C.
19. A method of plasma processing a layered structure, said method comprising the steps of:  
providing a layered structure comprising silicon nitride and silicon oxide over at least a portion thereof;  
generating a plasma from gases comprising first fluorocarbons having at least as many hydrogen atoms as fluorine; and  
employing said plasma to etch through at least a portion of said silicon oxide and expose a portion of said silicon nitride.
20. A method according to claim 19, wherein said first fluorocarbons comprise at least one of CH<sub>2</sub>F<sub>2</sub> and CH<sub>3</sub>F.
21. A method according to claim 20, wherein said gases further comprise second fluorocarbons comprising at least one of CHF<sub>3</sub> and CF<sub>4</sub>.
22. A method according to claim 21, wherein said gases further comprise argon.

23. A method according to claim 22, wherein said gases comprise about 3-25% of said first fluorocarbons.
24. A method according to claim 23, wherein said gases comprise about 13-32% of said second fluorocarbons.
25. A method according to claim 23, wherein said gases comprise about 3-10%  $\text{CHF}_3$ .
26. A method according to claim 25, wherein said gases comprise about 10-22%  $\text{CF}_4$ .
27. A method according to claim 26, wherein said gases comprise about 30-60% argon.
28. A method according to claim 23, wherein said gases comprise about 3-20 %  $\text{CH}_2\text{F}_2$ .
29. A method according to claim 19, further comprising the steps of:
- disposing said layered structure upon an electrode of a plasma etching chamber; and
- maintaining said electrode at a temperature of at least  $30^\circ \text{C}$  during said etching.

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